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[618] X-ray Linear Dichroic Tomography

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Functional materials, from catalysts to energy storage and load-bearing materials, are hierarchical polycrystalline composites. Their functionality derives from their composition, the 3D arrangement of components and their microstructure; the distribution of crystalline grains and the defects within them. Techniques providing this combination of information are currently either limited to planar investigations, provide insufficient spatial resolution, are destructive or don't allow the examination of system-representative volumes, hampering the rational-driven optimization of current and design of next-generation materials. Here, we introduce ptychographic X-ray linear dichroic vector tomography, facilitating a quantitative, non-invasive, and simultaneous intra- and inter-granular characterisation of extended polycrystalline and amorphous samples in 3D with nanometre spatial resolution.

Theoretical Work

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